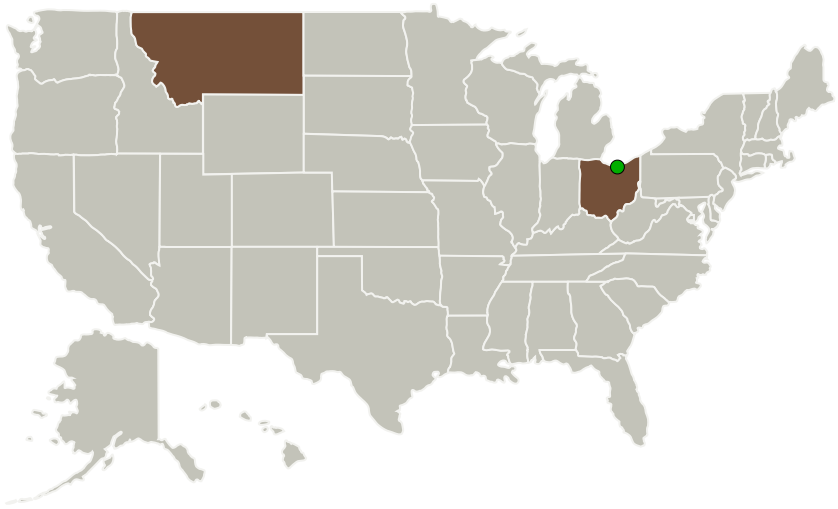
Fast, Low Loss, Electro-Optic Switch for Quantum Information Processing, Phase I

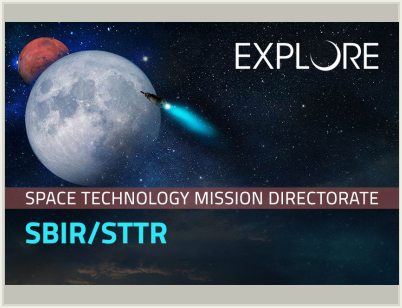
Completed Technology Project (2011 - 2011)

Project Introduction

Single photon sources and detectors hold the key to achieving success in several quantum communication and computation applications. Many of these goals can be achieved with the realization of low-loss high-speed switching for single photons. AdvR proposes a unique implementation of an electro-optic (EO) deflector with ideal properties for single photon switching. The device operates on the principle of electro-optically controlled prisms engineered into a ferroelectric substrate, and is designed to have very low loss (less than 0.1%), fast switching speed (sub-nanosecond), good isolation (~50dB crosstalk), and operation from the ultraviolet to the mid-infrared. AdvR has previously built and tested fiber-coupled EO switches and the demonstrated performance shows exciting potential for use in photonics-based approaches to quantum information science. This Phase I SBIR will investigate the use of the EO deflector technology for single photon switching and evaluate the feasibility of using engineered electro-optic deflectors to provide low-loss, high-speed switching for quantum information processing.

Primary U.S. Work Locations and Key Partners





Fast, Low Loss, Electro-Optic Switch for Quantum Information Processing, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Fast, Low Loss, Electro-Optic Switch for Quantum Information Processing, Phase I

Completed Technology Project (2011 - 2011)

Organizations Performing Work	Role	Type	Location
ADVR, Inc.	Lead Organization	Industry	Bozeman, Montana
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Montana	Ohio

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138154)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ADVR, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

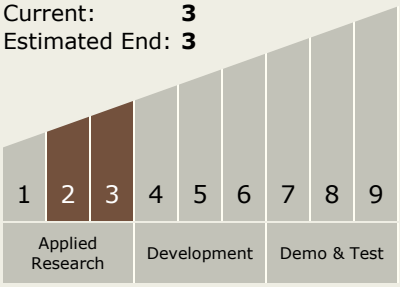
Carlos Torrez

Principal Investigator:

Anthony Roberts

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Fast, Low Loss, Electro-Optic Switch for Quantum Information Processing, Phase I

Completed Technology Project (2011 - 2011)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.1 Detector Development

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System